

## CLAIMS

I claim:

1. An apparatus comprising  
a pipe device; and  
an ultraviolet lighting device;  
wherein a substance can flow through the pipe device; and  
wherein the ultraviolet lighting device delivers ultraviolet radiation to the substance  
while it is inside the pipe device.
  
2. The apparatus of claim 1 wherein  
the substance is air.
  
3. The apparatus of claim 1 wherein  
the substance is water.
  
4. The apparatus of claim 1 further comprising  
an enclosure;  
wherein the pipe device is placed inside the enclosure;  
wherein the ultraviolet lighting device is placed inside the enclosure;  
wherein the enclosure is not ultraviolet transparent so that the ultraviolet radiation  
from the ultraviolet lighting device is contained within the enclosure.
  
5. The apparatus of claim 4 wherein

the enclosure has one inflow opening through which the substance can enter the enclosure and one outflow opening through which the substance can exit the enclosure.

6. The apparatus of claim 5 wherein

the enclosure has an inside surface which is ultraviolet reflective.

7. The apparatus of claim 4 wherein

the enclosure has a circular cross section.

8. The apparatus of claim 4 wherein

the enclosure has an elliptical cross section.

9. The apparatus of claim 4 wherein

the enclosure has a square cross section.

10. The apparatus of claim 4 wherein

the enclosure has a rectangular cross section.

11. The apparatus of claim 4 wherein

the enclosure has a polygonal cross section.

12. The apparatus of claim 4 wherein

the enclosure is further comprised of a plurality of inflow and outflow openings.

13. The apparatus of claim 12 wherein

the plurality of the inflow and the outflow openings are connected to the pipe device.

14. The apparatus of claim 1 wherein

the pipe device is comprised of one pipe that is ultraviolet transparent.

15. The apparatus of claim 1 wherein

the pipe device is comprised of a plurality of pipes that are ultraviolet transparent.

16. The apparatus of claim 15 wherein

each of the plurality of pipes has a circular cross section.

17. The apparatus of claim 15 wherein

each of the plurality of pipes has an elliptical cross section.

18. The apparatus of claim 15 wherein

each of the plurality of pipes has a square cross section.

19. The apparatus of claim 15 wherein

each of the pipes has a rectangular cross section.

20. The apparatus of claim 15 wherein

each of the pipes has a polygonal cross section.

21. The apparatus of claim 1 wherein

the pipe device is comprised of a plurality of pipes and connectors; and

wherein each of the pipes is connected to at least one other pipe by a connector.

22. The apparatus of claim 1 wherein

the pipe device is comprised of a plurality of pipes and two connecting covers;

wherein the two connecting covers contain a plurality of connectors connecting all pipes at each end.

23 . The apparatus of claim 1 wherein

the pipe device is comprised of a U-shaped pipe.

24. The apparatus of claim 1 wherein

the pipe device is comprised of a W-shaped pipe.

25. The apparatus of claim 1 wherein

the pipe device is comprised of a pipe containing multiple turns.

26. The apparatus of claim 1 wherein

the pipe device is comprised of a long and bended pipe in a spiral shape with multiple turns.

27. The apparatus of claim 1 wherein

the pipe device is comprised of a plurality of pipes each having a different shape.

28. An apparatus comprising

an enclosure; and

a pipe device; and

a ultraviolet lighting device;

wherein the enclosure is comprised of a plurality of inflow openings and a plurality of outflow openings;

wherein the pipe device is placed inside of the enclosure and is connected to the plurality of inflow openings and to the plurality of outflow openings;

wherein the ultraviolet lighting device is placed inside of the enclosure; and

wherein the ultraviolet lighting device delivers ultraviolet radiation to the flow inside the pipe device.

29. The apparatus of claim 28 wherein

the inside surface of the enclosure is reflects ultraviolet light.

30. The apparatus of claim 28 wherein

the pipe device is comprised of a plurality of pipes each of which are transparent to ultraviolet light.

31. The apparatus of claim 28 wherein

the pipe device is comprised of a plurality of pipes, each of which has a circular cross section.

32. The apparatus of claim 28 wherein

the pipe device is comprised of a plurality of pipes and connectors;

each of the pipes is connected to at least one other pipe by at least one connector.

33. The apparatus of claim 28 wherein

the pipe device is comprised of a plurality of pipes and first and second connecting covers;

wherein the two connecting covers containing a plurality of connectors connecting all pipes at each end.

34. The apparatus of claim 28 wherein

the pipe device is comprised of a U-shaped pipe.

35. The apparatus of claim 28 wherein

the pipe device is comprised of a W-shaped pipe.

36. The apparatus of claim 28 wherein

the pipe device is comprised of a pipe containing multiple turns.

37. The apparatus of claim 28 wherein

the pipe device is comprised of a long and bended pipe in a spiral shape with multiple turns.

38. The apparatus of claim 28 wherein

the pipe device is comprised of a first pipe having a first shape and a second pipe having a second shape, the first shape differing from the second shape.

39 . A method comprising the steps of

using pipes which are transparent to ultraviolet light to force a substance flowing through the pipes to travel longer inside a chamber containing an ultraviolet light source

for increasing the time during which the substance is exposed to ultraviolet radiation;  
wherein  
the pipes are connected.